17. (Twice Amended) An apparatus for performing the [The] method, as recited in claim 1[, wherein the stripping away the etch mask and removing some residual sidewall passivation, simultaneously strips away the etch mask and removes parts of the metal-containing layer that are redeposited to form residual sidewall passivation].

19. (Once Amended) A semiconductor chip formed by the [The] method, as recited in claim 1[, wherein the stripping away the etch mask and removing some sidewall passivation comprises removing metal containing parts of the metal-containing layer that are redeposited to form residual sidewall passivation].

20. (Cancelled).

REMARKS

The applicant would like to thank the Examiner for her time during the telephone conversation of February 27, 2003.

The Examiner stated that this is a final rejection. The applicant asks the Examiner to reconsider the finality of the rejection, since the applicant feels such a **final rejection is premature**. Regarding claims 2-5, the Examiner provided new grounds for rejection stating that these claims were obvious in view of Hsieh, even though these claims were not amended in the previous response.

Claims 1, 15, 17, and 19 have been amended. Claim 20 has been cancelled. Claims 1-19 are pending in the present application.

The Examiner rejected claims 17, 19, and 20 under 35 U.S.C. § 112, claims 17 and 19 have been amended, accordingly. Claim 20 has been cancelled.

The Examiner rejected claims 1, 15, and 18 under 35 U.S.C. § 102 as being anticipated by Hsieh et al. (US 5,776,832).

Claims 1 and 15 have been amended to recite that the etch mask stripping gas strips away the etch mask and removes most of the residual sidewall passivation. This is supported on page 9, lines 1-5, of the application. Hsieh does not teach the step of stripping away the etch mask and removing most of the residual sidewall passivation, while the substrate is in the etch chamber where plasma created by the etch mask stripping gas strips away the etch mask and removes most of the residual sidewall passivation, as recited in claims 1 and 15, as amended. Nothing in Hsieh discloses removing most sidewall passivation, while the substrate is in the etch chamber. The Hsieh method of ashing the aluminum sidewalls is not the same as the removal of most of the sidewall passivation, as claimed. Column 3, lines19-24, and column 6, lines 35 to 41, of Hsieh state that the oxygen ashing step strips photoresist and builds up sidewall passivation. The applicant agrees that the ashing step of Hsieh strips photoresist but Hsieh does not remove most sidewall passivation, but instead adds more sidewall passivation. For these reasons, Hsieh does not teach a step of stripping away the etch mask and removing most residual sidewall passivation, as recited in claims 1 and 15, as amended. For at least these reasons, claims 1 and 15, as amended, are not anticipated by Hsieh.

Claim 18 is dependent on claim 1 and further recites accelerating oxygen plasma to the substrate to remove parts of the metal-containing layer that are redeposited to form sidewall passivation. Col 3, lines 19-24, of Hsieh states that the oxygen ashing passivates the aluminum sidewalls by reducing the chlorine on the aluminum sidewalls. Therefore Hsieh teaches reducing the chlorine with oxygen, instead of removing parts of the metal containing layer that are redeposited to form sidewall passivation. For at least these reasons, claim 18 is not anticipated by Hsieh.

The Examiner rejected claims 2-14 under 35 U.S.C. § 103 as being unpatentable over Hsieh as applied to claim 1 above, and further in view of applicant's admitted prior art and Fukuyama et al. (US 5,770,100) and further in view of Tepman et al. (US 5,186,718).

Claim 2 is dependent on claim 1, and further recites the step of electrostatically attracting plasma from the etch mask stripping gas to the substrate in the etch chamber. Table I of Hsieh indicates that during the ashing step (step 3) the DC bias is 0 volts. It would not be obvious to electrostatically attract the plasma to the substrate during the strip during the method taught by Hsieh. Hsieh teaches away from applying such an electrostatic voltage during strip. As shown in Table I, Hsieh applies a bias during the etch, but purposely eliminates such an electrostatic charge during the strip. In addition, the applicant's admitted art does not teach applying an

electrostatic bias during stripping, since the applicant's admitted prior art stated that the prior art did such stripping outside of the etch chamber in a strip chamber. For at least these reasons, claim 2 is not made obvious by Hsieh in view of applicant's admitted prior art and Fukuyama et al. (US 5,770,100) and further in view of Tepman et al. (US 5,186,718).

Claim 3 is dependent on claim 2 and for at least this reason is not made obvious by Hsieh in view of applicant's admitted prior art and Fukuyama et al. (US 5,770,100) and further in view of Tepman et al. (US 5,186,718).

Claim 4 is dependent on claim 3 and further recites that the step of stripping away the etch mask and removing residual sidewall passivation further removes residue from walls of the etch chamber. The Examiner did not cite anything in the cited references that teaches removing residues from walls of the etch chamber. For at least these reasons, claim 4 is not made obvious by Hsieh in view of applicant's admitted prior art and Fukuyama et al. (US 5,770,100) and further in view of Tepman et al. (US 5,186,718).

Claim 5 is dependent on claim 4 and for at least this reason is not made obvious by Hsieh.

Claim 6 is ultimately dependent on claim 5 and further recites placing the substrate in a load lock and removing the substrate from the load lock to place the substrate in the etch chamber. For at least these reasons, claim 6 not made obvious by Hsieh in view of applicant's admitted prior art and Fukuyama et al. (US 5,770,100) and further in view of Tepman et al. (US 5,186,718).

Claim 7 is ultimately dependent on claim 6 and further recites placing the substrate in a corrosion passivation chamber after the substrate has been removed from the etch chamber and exposing the wafer to a non-plasma high temperature water vapor. Since Hsieh teaches passivating the chlorine in the etch chamber (col. 3, lines 19-21), Hsieh would teach away from subsequently putting the substrate in a passivation chamber after removing the substrate from the etch chamber. For at least these reasons, claim 7 is not made obvious by Hsieh in view of applicant's admitted prior art and Fukuyama et al. (US 5,770,100) and further in view of Tepman et al. (US 5,186,718).

Claims 8-14 each depend either directly or indirectly from claims 1-7, and are therefore respectfully submitted to be patentable over the art of record for at least the reasons set forth

above with respect to claims 1-7. Additionally, these dependent claims require additional elements that when taken in the context of the claimed invention, further patentably distinguish the art of record. For example, claims 11 and 14 recite that the step of electrostatically attracting plasma from the etch mask stripping gas comprises the step of biasing the chuck supporting the substrate to the bias power between –10 and –1,000 volts. Hsieh teaches that during the ashing step there is no bias. For at least these reasons, claims 8-14 are not made obvious by Hsieh in view of applicant's admitted prior art, in view of Fukuyama and in further view of Tepman.

The applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at (831) 655-2300.

If any fees are due in connection with the filing of this Amendment, the Commissioner is authorized to deduct such fees from the undersigned's Deposit Account No. 50-0388 (Order No. LAM1P133).

Respectfully submitted,
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CLEAN VERSION OF PENDING CLAIMS

1. (Once Amended) A method for etching at least partially through a metal-containing layer disposed above a substrate, wherein part of said metal-containing layer is disposed below an etch mask and part of said metal-containing layer is not disposed below the etch mask, comprising the steps of:

placing the substrate in an etch chamber;

flowing an etchant gas into the etch chamber;

creating a plasma from the etchant gas in the etch chamber;

etching away parts of the metal-containing layer not disposed below the etch mask, wherein some of the etched away parts of the metal-containing layer is redeposited to form residual sidewall passivation while the substrate is in the etch chamber;

discontinuing the flow of the etchant gas into the etch chamber;

flowing an etch mask stripping gas into the etch chamber;

creating a plasma from the etch mask stripping gas in the etch chamber;

stripping away the etch mask and removing most of the residual sidewall passivation, while the substrate is in the etch chamber, wherein plasma created by the etch mask stripping gas strips away the etch mask and removes most of the residual sidewall passivation; and

removing the substrate from the etch chamber.

2. The method, as recited in claim 1, further comprising the steps of:

electrostatically attracting the plasma from the etchant gas to the substrate in the etch chamber; and

electrostatically attracting the plasma from the etch mask stripping gas to the substrate in the etch chamber.

3. The method, as recited in claim 2, wherein the etch chamber is a metal etch chamber.

4. The method, as recited in claim 3, wherein the step of stripping away the etch mask and removing residual sidewall passivation further removes residue from walls of the etch chamber.

5. The method, as recited in claim 4, wherein the etch mask stripping gas comprises oxygen.

6. The method, as recited in claim 5, further comprising the steps of:

placing the substrate in a load lock; and

removing the substrate from the load lock to place the substrate into the etch chamber.

7. The method, as recited in claim 6, further comprising the steps of:

placing the substrate into a corrosion passivation chamber after the substrate has been removed from the etch chamber; and

exposing the wafer to a non-plasma high temperature water vapor.

8. The method, as recited in claim 7, further comprising the steps of:

transferring the substrate from the corrosion passivation chamber to a cooling station;

cooling the substrate in the cooling station; and

transferring the substrate from the cooling station to the load lock.

9. The method, as recited in claim 8, further comprising the step of maintaining a pressure between 1 and 80 millitorr during the etching and stripping steps.

10. The method, as recited in claim 9, further comprising the step of maintaining the substrate at a temperature between 10° and 100° C during the etching and stripping steps.

11. The method, as recited in claim 10, wherein the step of electrostatically attracting the plasma from the etchant gas comprises the step of biasing a chuck supporting the substrate to a bias power between –10 and –1,000 volts, and wherein the step of electrostatically attracting the plasma from the etch mask stripping gas comprises the step of biasing the chuck supporting the substrate to a bias power between –10 and –1,000 volts.

12. The method, as recited in claim 4, further comprising the step of maintaining a pressure between 1 and 80 millitorr during the etching and stripping steps.

13. The method, as recited in claim 12, further comprising the step of maintaining the substrate at a temperature between 10° and 100° C during the etching and stripping steps.

14. The method, as recited in claim 13, wherein the step of electrostatically attracting the plasma from the etchant gas comprises the step of biasing a chuck supporting the substrate to a bias power between –10 and –1,000 volts and wherein the step of electrostatically attracting the plasma from the etch mask stripping gas comprises the step of biasing the chuck supporting the substrate to a bias power between –10 and –1,000 volts.

15. (Once Amended) A method for etching at least partially through a metal-containing layer disposed above a substrate, wherein part of said metal-containing layer is disposed below an etch mask and part of said metal-containing layer is not disposed below the etch mask, comprising the steps of:

placing the substrate in the etch chamber;

etching away parts of the metal-containing layer not disposed below the etch mask, wherein some of the etched away parts of the metal-containing layer is redeposited to form residual sidewall passivation on the substrate, while the substrate is in the etch chamber;

using a stripping gas to strip away the etch mask and remove most of the sidewall passivation while the substrate is in the etch chamber; and

removing the substrate from the etch chamber.

16. An apparatus for etching at least partially through a metal-containing layer disposed above a substrate, wherein part of said metal-containing layer is disposed below an etch mask and part of said metal-containing layer is not disposed below the etch mask, comprising:

means for placing the substrate in an etch chamber;

means for flowing an etchant gas into the etch chamber;

means for creating a plasma from the etchant gas in the etch chamber;

means for etching away parts of the metal-containing layer not disposed below the etch mask, wherein some of the etched away parts of the metal-containing layer are redeposited to form residual sidewall passivation while the substrate is in the etch chamber;

means for discontinuing the flow of the etchant gas into the etch chamber;

means for flowing an etch mask stripping gas into the etch chamber;

means for creating a plasma from the etch mask stripping gas in the etch chamber;

means for stripping away the etch mask and removing some residual sidewall passivation, while the substrate is in the etch chamber; and

means for removing the substrate from the etch chamber.

17. (Twice Amended) An apparatus for performing the method, as recited in claim 1.

18. The method, as recited in claim 1, wherein the stripping away comprises accelerating oxygen plasma to the substrate to remove parts of the metal-containing layer that are redeposited to form residual sidewall passivation.

19. (Once Amended) A semiconductor chip formed by the method, as recited in claim 1.

20. (Cancelled).